

*Change of Channel in Missouri River.*—On the 12th the bar on Yankton side of channel appeared to have increased during late rise, and steamers were compelled to finish loading nearly a mile below city.

## TEMPERATURE OF WATER.

The temperature of water, as observed in rivers and harbors, with average depth when observations were taken, are given in table on chart No. II. Observations were interrupted at the following places on the dates indicated: on account of ice, noticed under navigation, at Alpena, 1st to 10th; Buffalo, 5th and 6th; Burlington, 1st to 23rd; Detroit, 1st; Escanaba, 1st to 25th; Marquette, 1st to 21st: water too rough, at Cleveland on the 3rd, 4th, 10th, 11th, 15th and 17th; loss of thermometer at Augusta, 29th and 30th, at Galveston, 7th to 30th, Toledo 26th to 30th, and San Francisco, 1st to 30th. Reports to hand since printing of table: Norfolk, max. temp., 63°; min., 48°; depth, 22 feet. Punta Rassa, max. tem., 80°; min. tem., 70°; depth, 12 feet.

## ATMOSPHERIC ELECTRICITY.

*Thunder-storms.*—1st, Pa., Tex., La., Ala., Tenn., Ga.; 3rd, Ohio, Nev.; 4th, Tenn., Cal., Col.; 5th, Col., Neb.; 6th, Kan., Neb., Ark., Dak., Ill., Ia., Mo., Neb., Cal., Ind. Ty., Tenn.; 7th, Ala., Ga., Mo., Cal.; 8th, Ala., Kan., Mo., Neb., Ind. Ty., Tex., Dak.; 9th, Ill., Ind., Ia., Ky., La., Miss., Mo., Tenn., Tex., Dak., Ala.; 10th, Ala., Fla., Ia., Can., Md., N. C., Ohio, Pa., Va., W. Va., Ga.; 11th, Kan., Ohio.; 12th, Col.; 13th, Kan., Ky., La., Miss., Mo., Ohio, Tex., Cal., Ind. Ty.; 14th, La., Utah, Ala., Fla., Ga., Ill., Ind., Kan., Ky., Mo., N. C., Ohio, Tex., Col., Tenn.; 15th, Va., Ala., Ill., La., Md., Miss., N. J., N. C., Ohio, Pa., Tenn., Tex., Fla., Ga., N. J.; 16th, Ga., Ala., Fla., Ia., Miss., N. C., Pa., Tenn., Tex., La., S. C.; 17th, Ga., Fla., N. C., Pa., Va., S. C.; 18th, N. C.; 19th, Idaho; 20th, Kan., Neb.; 21st, Tex., Kan., Neb., Dak.; 22nd, Kan., Tex., Ind. Ty., Dak.; 23rd, Neb., Kan., N. J., Tex., Ind. Ty.; 24th, Kan., Wis., Ind. Ty., Tex.; 25th, Ark., Fla., Ind., Kan., Miss., Ohio, Tex., La.; 26th, Can., Fla., Ia., La., Miss., Mo., Ohio, Tex., Col.; 27th, Ga., Fla., Ill., Kan., N. C., Ohio, Pa., Tex., Col., Ind. Ty., Ia., Mich., Wis., N. Y.; 28th, Kan., N. Y., Can., Fla., Mass., Mo., Neb., N. J., N. C., Pa., Va., Miss., Ala.; 29th, Mass., Neb., Wy. Ty., Conn., Ind., Kan., Mich., Mo., N. C., Col., Ga.; 30th, Neb., Ark., Kan., Mass., Mo., N. J., N. C., Cal., Col., Ind. Ty., Tex., Va.

*Auroras.*—2d, Nora Springs, Ia.; 7th, Fallsington, Pa.; 8th, Starkey, N. Y., Fallsington, Pa.; 11th, 12th and 13th, Mt. Forrest, Can.; 14th, Pembina, Alpena, Eastport, and Mt. Forrest, Can.; 19th, Eastport, Bangor, Gardiner, Orono and Portland, Me., Burlington, Woodstock, West Charlotte and Newport, Vt., Springfield, Westborough, Waltham and Rowe, Mass., Southington and New Haven, Conn., Freehold, South Orange, Atco, Moorestown, Linden, Somerville and Princeton, N. J., Woodstock, Md., Catawissa, Pa.; Starkey, Hector, North Volney, Waterburgh, Albany, Oswego, Rochester, Buffalo and Erie, N. Y., Mt. Forrest, Can., Ruggles, Ringgold and Cleveland, Ohio, Riley, Ill., Cresco, Ia., Alpena, Mich., Beloit, Embarrass and Manitowoc, Wis., Duluth, Minn., and Pembina, Dak.; 20th, Cornish, Me., Mendon and Fall River, Mass., Contoocookville, N. H., Ardenia, N. Y., Woodstock, Vt., and Wautoma, Wis.; 23rd, Ardenia, N. Y.; 25th, Woodstock, Md.; 26th, Clarksville, Tex., Cambridge, Mass., regularly looked for at 8 p. m.; none seen at that time; 19th, between 8 and 9 p. m., auroral light seen between the clouds; suspected on the 20th at 9 p. m.; cloudy on 3rd, 4th, 5th, 7th, 10th, 11th, 13th, 15th, 17th, 18th, 19th, 25th to 29th; some clouds, 2nd, 14th, 24th; moonlight, 1st, 2nd, 6th, 30th.

*Telegraphic Communication Interfered with by Atmospheric Electricity.*—Santa Fe, N. Mex., 15th, 17th and 22nd; Colorado Springs, Col., 11th; Pike's Peak, 23rd; Fort Sill, Ind. Ty., 8th, communication stopped and instruments cut out; Umatilla, Or., 30th; Cape Hatteras, 10th, 16th, 18th, 30th; Mason, Tex., 15th; Pembina, Dak., 8th.

*Ground Currents.*—Pike's Peak, 10th, line heavily charged.

## OPTICAL PHENOMENA.

*Solar Halos.*—1st, Ala., Neb., Ohio. 2nd, N. C., Ga. 3rd, Ga., Cal., Utah. 4th, Mont., Tex., Mich., Mass. 5th, Mich., Ohio. 6th, Ind., Ohio, Mich. 7th, Ind., Conn., Mich., N. J., Ohio, Pa. 8th, Iowa, Mo., Minn. 9th, Ind., Nev., Mont., Ohio, Mich., N. H., N. J., N. Y. 10th, Fla., Minn., Me., N. H. 11th, Dak., Minn., Neb. 12th, Ill., Ind., Ia., Utah, Tex., Wis., Minn., Ohio, Mich. 13th, Iowa, Ohio, Me., Mass., N. H., N. Y. 14th, Ohio, Conn., Miss. 16th, Ill., Ind., Tex., Mo., Ohio, N. J., Pa. 17th, Ia., Ohio. 18th, Cal., Utah, Nev., Ia., Ga., Mo. 19th, Ia., Mich., Ohio, N. Y., Pa. 20th, Ala., Ind., Ia., Fla., Mo., Ohio, N. C., Mich., N. Y. 21st, Ia., Conn., N. J., N. Y. 22nd, Me., Mich. 23rd, Conn., N. Y., Me., N. H., N. Y. 24th, Minn., Conn., Mo., Neb., N. Y., Pa. 25th, Conn., Ind., Minn., N. Y., Me., Mass. 26th, Miss., Iowa, Minn., Tenn., Mich. 27th, Ia., Minn., N. C., Ga., Va., N. Y., Pa. 28th, Cal., Ia., Tenn. 29th, Ia., Minn., Ohio, Va., Mass., N. H., N. J., N. Y. 30th, Conn., Ia., Ohio, Mass., Miss., N. J.

*Inun Halos.*—1st, Col., Ohio, Md., Mo., Neb., Va., Vt. 2nd, Neb. 3rd, Cal., Utah, Nev., Idaho, Dak., Mich., N. J., Ga., N. H. 4th, Conn., Ind., Neb., Kan., Tex., Miss., Mich., Ohio, Mass., Ga. 5th, Ind., Col., Wis., Tenn., Kan., Mo., N. J., Ga., N. H. 6th, Ia., Dak., Va., Ga., N. H. 7th, Dak., Minn., Wis., W. Va., Mich., Mo. 8th, Ind., Miss., Wis., Tenn. 9th, Ind., Tex., Me. 10th, Wis., Mass. 12th, Tenn. 17th, Dak., 18th, Ohio. 22nd, N. Y. 23rd, Wis. 24th, Mass. 25th, Ind., Minn., Tenn., Ohio. 26th, Iowa, Mo., Kan., Mich. 27th, Iowa, Ind. Ty., Dak., Mo., Mass., N. Y., Pa., Va., N. C. 28th, Ill., Nev., Dak., Kan., Mich., Ind., Tenn., N. Y., Ohio, Va. 29th, Ill., N. M., Kan., Tex., Minn., Wis., Tenn., Mo., N. Y., Ga. 30th, Utah, Nev., Ind. Ty., Tex., Ind., Me., Mich., Mo., Va., N. H., Conn., Mass.